Section 16. Summer Flounder

Introduction

Summer flounder (*Paralichthys dentatus*) are one of the most important sought after recreational and commercial fish in the Chesapeake region. They are a bottom-dwelling predator that live in estuarine and coastal waters from Canada to the east coast of Florida. Flounder are most abundant in the Mid-Atlantic region from Cape Cod, Massachusetts to Cape Fear, North Carolina. Most summer flounder inhabit the Chesapeake Bay in the summer and move offshore to depths of 120 to 600 feet during the fall and winter feeding on small fishes, squid, sea worms, shrimp and other crustaceans. Some summer flounder over-winter in the Bay. Flounder are more common in the deep channels of the lower Bay than in the upper Bay, extending as far north as the Gunpowder River.

Summer flounder can live to 20 years of age with females living longer and growing larger than males (up to 95 cm TL (3ft)). They usually begin to spawn at age 2 or 3 when they reach about 10 inches in length. Spawning occurs during the fall while fish are moving offshore. Larvae drift and migrate inshore, entering coastal and estuarine areas from October to May. The fry become bottom dwelling upon reaching the coast and spend their first year in bays or inshore areas. At the end of their first year, some of the juveniles join the adult offshore migration. The migratory patterns of summer flounder vary with latitude. Fish generally spawn and move offshore earlier in the northern part of the range. There is evidence that summer flounder migrate south and offshore in the fall from summering areas in New Jersey and New York, and migrate inshore to the north and east in the spring.

Chesapeake Bay FMP

A Chesapeake Bay Program (CBP) Summer Flounder Fishery Management Plan (FMP) was developed and adopted in 1991. At that time, the Atlantic coast stock was overfished and the stock seriously depleted. Estimated fishing mortality rates were at least six times greater than the coastal target level. The CBP 1991 plan implemented a number of management measures that have been successful at reducing mortality and increasing the size of the stock. Minimum size limits have been successful at allowing more fish to reach maturity and spawn, thus increasing the stock size. Commercial quotas and recreational harvest limits have been successful at reducing fishing mortality. The plan followed the guidelines established by the Atlantic Marine Fisheries Commission (ASMFC) and the Mid-Atlantic Fisheries Management Council (MAFMC) and focused on making Bay regulatory actions compatible where possible. A synopsis of the plan can be found on Table 16.1.

As the stock began to improve, the Bay jurisdictions adopted Amendment # 1 to the CBP 1991 Summer Founder FMP in 1997. The amendment updated the status of the stock and adopted the new targets proposed by the MAFMC. It expanded how the Chesapeake Bay jurisdictions would implement the coastal quota and recreational harvest limits; how they would allocate the Bay and coastal allocation; and the implementation of summer flounder commercial permits. A synopsis of Amendment #1 can be found on Table 16.2.

Atlantic Coast FMP

Summer flounder are managed along the Atlantic coast as a multispecies unit with black sea bass and scup. These three species are often caught together in the offshore trawl fishery. Since a significant portion of the catch was taken from state waters, the ASMFC took the lead and developed an FMP in 1982. The MAFMC completed and adopted a federal plan for summer flounder in 1988 based on ASMFC's management plan. Eleven amendments have been jointly developed by ASMFC and the

MAFMC since the adoption of the plans, and provide a comprehensive management program. For a complete history of the ASMFC plan and amendments, visit the website at www.asmfc.org. Amendment 8 established management measures for scup (*Stenotomus chrysops*) and Amendment 9 established a management program for black sea bass (*Centropristis striata*). Both of these were major amendments that implemented a number of management measures for scup and black sea bass including commercial quotas, commercial gear requirements, minimum size limits, recreational harvest limits, and permit and reporting requirements.

The main objectives of the coastal FMP were to reduce fishing mortality and increase the stock size under a stock rebuilding schedule. Amendment 12 to the Summer Flounder, Scup, and Black Sea Bass FMP was approved by the ASMFC in October 1998 and revised the overfishing definitions, identification, and description of essential fish habitat, and adjusted the framework for rebuilding. The updated overfishing definition, with F_{max} serving as a proxy for F_{msy}, is 0.32 under current stock conditions. The fishery had been subjected to lengthy closures and some significant quota overages starting in 1998. Fishery closures occurred as a result of filled/exceeded quotas, and the implementation of quotas resulted in increased discards. Significant financial hardship to the fishing industry occurred due to a decrease in market demand caused by a fluctuating supply. To address these issues, the Management Board enacted a series of Emergency rules in 2001 establishing initial possession limits, triggers, and adjusted possession limits. While these measures helped reduce the length of fishery closures, the rapidly changing regulations were confusing for fishermen and added significant administrative burden to the states. To simplify the process for all parties, the Board approved Addendum VI to provide a mechanism for initial possession limits, triggers, and adjusted possession limits to be set during the annual specification process without the need for further Emergency Rules.

In 2002, Amendment 13 was approved and implemented a federal coastwide, annual quota using a state-by-state allocation system. This amendment was implemented in 2003 and 2004, and will be followed by a review of its effectiveness and possible re-implementation or revision. State-specific shares are as follows: Maine and New Hampshire 0.5%, Connecticut 1%, Delaware 5%, New York 7%, Rhode Island, North Carolina, and Maryland 11%, Massachusetts 13%, New Jersey and Virginia 20%.

Current management measures include an annual commercial quota and recreational harvest limit, minimum sizes, minimum mesh requirements for trawls, permits and administrative fees for dealers and vessels, a moratorium on entry into the fishery, mandatory use of sea samplers, monitoring of sea turtles in the southern part of the management unit, and collection of data and records from dealers and processors. Fishing mortality is controlled by setting the total allowable landings (TAL) each year since 1993. The commercial fishery is allocated 60% of the TAL and the recreational fishery is allocated 40% of the TAL (ASMFC 2004). Coastal states are required to complete an annual compliance report (Appendix 10).

Stock Status

According to the Advisory Report of the 35th Northeast Regional Stock Assessment Workshop (35th SAW) in June of 2002, the stock is not overfished and overfishing is occurring relative to the FMP overfishing definition. The NEFSC Southern Demersal Working Group met in June 2004 to update the summer flounder stock assessment. This assessment indicated the stock is not overfished but overfishing is occurring relative to the biological reference points detailed in Amendment 12. The fishing mortality rate declined from 1.32 in 1994 to 0.29 in 2002, but is above the current overfishing definition reference point of Fmax= 0.26. Total stock biomass has increased substantially since 1991 to 149 million pounds in 2003, 27% above the biomass threshold. The average year class estimate for 1982 to 2003 is about 40 million and the 2002 year class was estimated above average at 51 million. The 2003 year class was

estimated to be below average though the VPA analysis tends to underestimate the abundance of age 0 fish for recent year classes.

Chesapeake Bay Status

The 2004 Maryland finfish stock assessment noticed a slight decrease in summer flounder mean lengths in 2004 (Table 16.3) as compared to 2003 but noted that relative stock densities in 2004 were similar to 2003. (Table 16.4).

Table 16.3 - Summer Flounder Mean Length From Maryland Pound Net Surveys (1993-2004)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Mean Length	347	309	297	335	295	339	325	347	358	324	353	327
Std dev	58	104	62	65	91	53	63	46	50	93	56	101
n	209	845	1669	930	818	1301	1285	1565	854	486	759	577

Table 16.4 - Relative Stock Density of Summer Flounder from Chesapeake Bay summer pound net survey, 1993-2004)

	Stock	Quality	Preferred	Memorable	Trophy
1993	29	56	16		
1994	24	56	20	<1	
1995	68	25	6	1	
1996	25	61	13	1	
1997	47	39	14		
1998	30	57	12	<1	
1999	42	50	8	<1	
2000	22	66	12	<1	
2001	20	61	19	<1	
2002	41	35	24	<1	
2003	21	63	15	<1	
2004	23	55	21	1	

Fishery Statistics

During the late 1980's coastwide landings declined dramatically, reaching a low of 9.3 million pounds in the commercial fishery in 1990 and 3.2 million pounds in the recreational fishery in 1989. With the implementation of a commercial quota in 1993, commercial harvest has been limited to between 8 and 15 million pounds a year. Commercial landings have exceeded the quota by less than 1% in seven out of twelve years. The quota for a particular year depends on the calculations of F from the previous year and adjustments needed to reach the target F from the rebuilding schedule. For the past three years, the quota for the commercial fishery has been increasing. The total coastwide commercial quota for 2004 was 19.92 million pounds.

The recreational harvest has been controlled by a recreational limit since 1993. The coastwide harvest limit has been between 7.04 and 11.28 million pounds. New York, New Jersey, and Virginia accounted for the majority of recreational landings in 2003.

The 2004 commercial harvest in the Chesapeake Bay was 277,836 pounds from Maryland and 4,128,078 pounds from Virginia (Figure 16.1). The estimated recreational harvest of summer flounder has remained approximately stable for the past three years for both Maryland and Virginia (Figure 16.2). The 2004 Maryland estimated recreational summer flounder harvest was 145,188 pounds and the Virginia estimated harvest was 1,416,275 pounds.

Summary

Summer flounder are not currently overfished but overfishing is occurring relative to the FMP overfishing definition. Maryland has been successful at staying within the limits of the commercial quota and the recreational harvest limit. Additional management measures will need to be considered if overfishing is continuing to occur.

References

ASFMC. 2004. The 2004 Review of the Atlantic States Marine Fisheries Commission Fishery Management Plan for Summer Flounder, *Paralichthys dentatus*. Prepared by T. Kerns and the Summer Flounder Plan Review Team.

Figure 16.1. Commercial Landings for Summer Flounder from Maryland and Virginia, 1958-2004

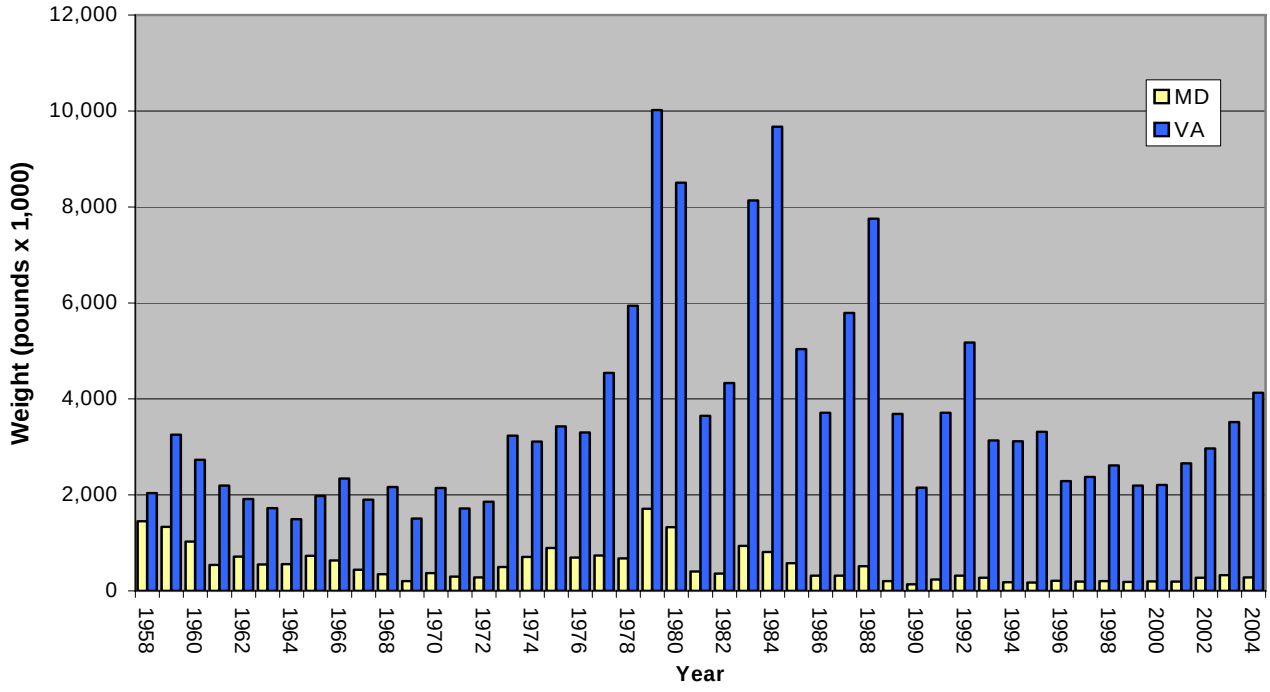

Figure 16.2. Estimated Recreational Harvest for Summer Flounder from Maryland and Virginia, 1981-2004

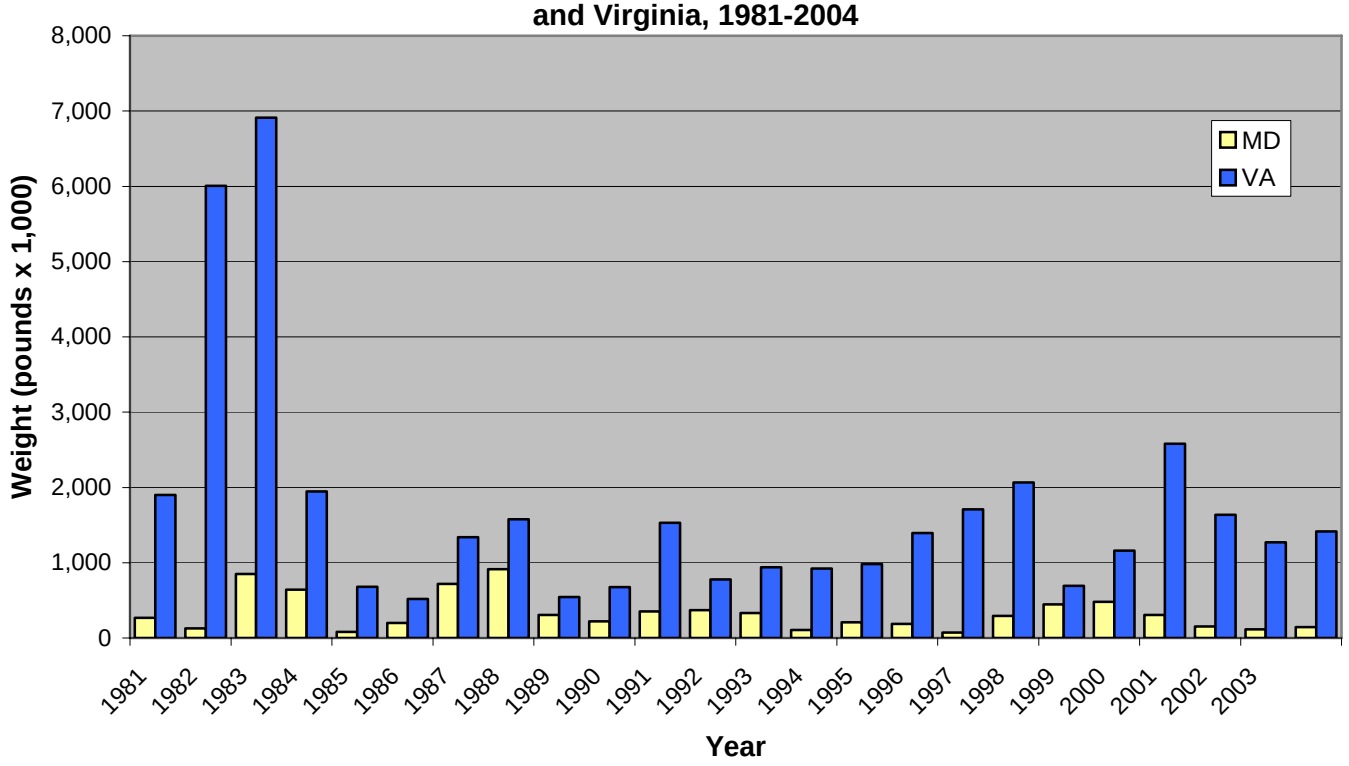

Table 16.1. 1991 Chesapeake Bay Program Summer Flounder Implementation (2005)

Problem Area	Action	Date	Comments
1. Overfishing	1.1a MD, VA and PFRC will propose an increase in their minimum size limit for recreationally caught flounder from 13" to 14"	1992 1993 1999 2002 2005	PFRC implemented a 14" size limit beginning in 1992. Maryland and implemented a 14" size limit in 1993. Since then increases in minimum size limits have been implemented based on MAFMC recommendations. In 2005, Maryland has implemented a 15.5" minimum size limit within the Maryland portion of the Bay while Virginia has implemented a 16.5" limit.
	1.1b MD, VA and PFRC will propose creel limits and seasonal restrictions in compliance with MAFMC recommendations	Continue	For 2005, the summer flounder creel limit in Maryland will be 4 fish in the Atlantic coast and coastal bays and a 2 fish limit within the Maryland portion of the Chesapeake Bay. The creel limit for Virginia will be 6 fish. Creel limits and seasonal restrictions have changed from year to year based on the status of the stock
	1.1c Commercial size limits will remain in effect for VA and MD; PFRC will propose a 14" size limit. A 5.5" or 6" minimum mesh size will be implemented in all directed flounder trawl fisheries.	1992 1993 1999 Continue	PFRC established 14"size limit for commercial fishery in 1992. MD and VA have had a 13" size limit since 1993. VA has a ban on trawling in state waters. MD implemented a 5.5" minimum mesh size for the directed trawl fishery (beginning 1993). Minimum size limits for the commercial fishery were increased to 14" with a quota
	1.1d Commercial fisheries will be subject to a quota administered by MAFMC. Each state's fishery will close when its quota is met.	Continue	Commercial quota system started in 1993. For 2005, MD was allotted 434,853 lbs and VA was allotted 3.7 million pounds. There have been minor adjustments to the annual quotas because of overages.
	1.2a VA and MD will implement a 5.5" diamond or 6" square mesh in all directed trawl fisheries to allow escapement of immature flounder	1993 Continue	MD implemented a 5.5" diamond or 6" square mesh for founder trawl fisheries in 1993. VA has a ban on trawling in state waters.
	1.2b VA and MD will promote implementation of 5.5"diamond or 6" square mesh in all EEZ directed trawl fisheries	Continue	The minimum mesh size for trawls in EEZ went into effect in November 1992.

Table 16.1. 1991 Chesapeake Bay Program Summer Flounder Implementation (2005)

Problem Area	Action	Date	Comments
	1.3a MD will collect information from pound nets and ocean trawl fisheries to develop strategies for reducing bycatch of undersized flounder and other species	1993 Continue	MD implemented a pound net sampling program beginning in 1993 and continuing to present. Sampling from ocean trawlers is generally opportunistic.
	1.3b VA will monitor species composition and biological characteristics of its pound net fishery and take steps to reduce bycatch as needed.	Continue	
	1.3c MD, VA and PFRC will work with MAFMC and ASMFC to encourage the protection of immature flounder	Continue	
2. Stock Assessment and Research Needs	2.1 The jurisdictions will conduct stock identification work.	Continue	VMRC continued their stock assessment work, collecting length and age data.
	2.2 Continue collection of data from commercial catches	Continue	VMRC samples commercial fishery in the Bay. MD sampled pound nets and offshore trawl catches.
	2.3 Continue on-going commercial statistics programs; VA will pursue its mandatory reporting system. VA and MD will continue to supplement the MRFSS	Variable	Mandatory reporting was implemented in VA (1993). All participants in the summer flounder trawl fishery are required to report in NMFS logbooks.
	2.4 Continue the baywide trawl survey to measure size, age, sex, distribution, abundance and CPUE	Continue	MD conducts a multi-species sampling program from pound nets and fykes throughout the Bay. Also conducts a juvenile trawl survey in the coastal bays. VIMS also conducts a baywide trawl survey
3. Habitat Issues	3.1 Promote the objectives of the Chesapeake Bay Agreement to improve water quality	Continue	The Bay Program continues to create and protect habitat, prevent pollution, enhance living resources, educate and involve the public and monitor and measure progress

Key
ASMFC= Atlantic States Marine Fisheries Commission CPUE= Catch per unit effort EEZ= Exclusive Economic Zone, 3-200 miles offshore
MAFMC= Mid-Atlantic Fisheries Management Council MRFSS= Marine Recreational Fisheries Statistics Survey PRFC= Potomac River Fisheries Commission VIMS= Virginia Institute of Marine Science VMRC= Virginia Marine Resources Commission

Table16.2 Amendment #1 to the 1991 Chesapeake Bay Program Summer Flounder FMP *(Amendment adoption: 1997, updated 2005*)

Problem Areas	Action	Date	Comments
1.1 Stock Status	Target fishing mortality rate for coastal stock is (F=0.3). Overfishing definition for coastal stock is (F_{max}= 0.23) as set by MAFMC/ASMFC. MAFMC/ASMFC has stipulated that 60% of the annual quota should be allotted to the commercial fishery and 40 % to be allotted to the recreational fishery.	1991 1998 2001 2003 2005	Total stock biomass has increased since 1991, reaching a high in 2003 at 149 million pounds (27% above the biomass threshold). Based on the 2004 Summer Flounder Working Grp, the stock is no longer overfished but overfishing is occurring. The estimated F for 2002 was 0.29, above the overfishing reference point of 0.26. The coastal stock will continue to be managed under a TAL, with a commercial quota and a recreational limit. A Chesapeake Bay FMP was adopted in 1991. Since 1991, Chesapeake Bay jurisdictions have been in compliance with MAFMC/ASMFC's quotas, target fishing mortality rates, and overfishing definitions.
2.1 Overfishing	1.1a The jurisdictions will implement annual quotas, individual quotas and/or possession limits in addition to seasonal restrictions, minimum mesh size requirements, minimum size limits, limited entry and license requirements to meet the coastwide quota. The traditional balance of harvest between the Chesapeake Bay and the Atlantic Coast will be maintained.	1991 Continue	The TAL for the coastal stock was 28.2 million lbs for 2004. The commercial quota for MD was 283,951 lbs and for VA, 2,968,429 lbs. The state by state quotas are based on historical landings with MD allotted 2% and VA allotted 21.3% of the total coastal landings.
	1.1b The jurisdictions will implement recreational seasons, creel limits and minimum size limits to meet the annual coastal harvest limits set forth by the MAFMC/ASMFC.	1991 Continue	A recreational harvest limit of 11.28 million lbs. was implemented for 2004. No changes were recommended regarding size or creel limits.
	1.1c Maryland and Virginia will maintain the traditional commercial fishery by requiring a special landings permit for the Atlantic summer flounder fishery. The jurisdictions will develop, define and adopt criteria to determine eligibility for participation in the fishery.	1991 Continue	

ASMFC= Atlantic States Marine Fisheries Commission
MAFMC= Mid Atlantic Fisheries Management Council
FMP= Fisheries Management Plan
SSB= Spawning Stock Biomass